

PACKAGE ID - 001339IBMPC00 WBGTC

KWIC TITLE - WBGTC Calculator

AUTHORS - Hunter, C.
Westinghouse Savannah River Co., Aiken, SC (United States)

LIMITATION CODE -COPY **AUDIENCE CODE** - LIM

COMPLETION DATE - 08/01/2000 **PUBLICATION DATE** - 08/01/2000

DESCRIPTION - This software calculates a Wet Bulb Globe Temperature (WBGTC) using standard measurements from a meteorological station. WBGTC is used by Industrial Hygienists (IH) to determine heat stress potential to outdoor workers. Through the mid 1990's, SRS technicians were dispatched several times daily to measure WBGTC with a custom hand held instrument and results were disseminated via telephone. Due to workforce reductions, the WSRC IH Department asked for the development of an automated method to simulate the WBGTC measurement using existing real time data from the Atmospheric Technologies Group's meteorological monitoring network.

PACKAGE CONTENTS - Media Directory; Software Abstract; Media Includes User Guide, Executable;

SOURCE CODE INCLUDED? - No

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - The WBGTC is a weighted sum of three component temperatures : (1) a globe temperature, T_g , which is the temperature achieved by a hollow blackened copper sphere passively exposed to the ambient environment; (2) a natural wet bulb temperature, T_n , which is the temperature achieved by a standard thermometer wrapped in a moist white wick and passively exposed to the ambient environment; and (3) the standard ambient dry bulb temperature. The software simulates the response of the globe thermometer by solving a heat balance equation that incorporates the solar load, the ambient long wave radiant load, and convection. The equation is solved for T_g using measurements of ambient temperatures, wind speed and solar radiation. The calculation also requires calculation of the current solar zenith angle and is specific to the geometry of sun incident on a sphere. Estimates of T_n are based on an empirical expression that was derived from collocated measurements of T_b using the hand held WBGTC device and the standard meteorological variables from the monitoring network. Regression analysis was used to derive a predictive expression for T_n based on the routinely measured values of standard psychrometric wet bulb T_w , wind speed, and solar radiation. The calculated values of T_g and T_n are used along with the measured ambient temperature to determine the estimated WBGTC.

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COMPUTER - IBM PC

OPERATING SYSTEMS - VMS, DOS

SOURCE CODE AVAILABLE (Y/N) - N

UNIQUE FEATURES - Physical simulation of a WBGT instrument using standard meteorological data. This helps to reduce the workload for technicians who otherwise would need to make numerous measurements, and, when integrated into an automated system can be used to post WBGT (and heat stress) information to a large work force in an efficient and timely manner.

ABSTRACT STATUS - Released as-is 8/9/2000

SUBJECT CLASS CODE - Z

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE

PACKAGE TYPE - AS - IS